

Trip to Wyoming

1899

~~First~~ Second book.

doc. 80

Property of Charles  
Schuchert

U. S. National Museum  
Washington, D. C.

Forest Field Expedition consists of  
July 21.  
19 wagons  
24 tents  
6 Cooks  
85 <sup>Directors Prof Knight</sup>  
geologists, students and learners,  
of which there are ~~are~~ 19.

doc. 80

Como. Anticline.  
Red beds Triassic  
Baptorodon beds marine Jurassic  
Atlantosaurus beds fresh w. "  
Great Dinosaur horizon. Look for  
small mammals in "dirt beds."  
Dakota sandstone. Plants fr. water.

Fossils 20m. east Floma station in cream  
colored beds. Poor Lam.

### Green River

Fossil beds 4m. W in R.R. cut. Also along  
Bitter Creek.

Hampsford see John H. Hadolenham.

Marine Jar. loc. of Knight.  
Freezeout Mts., Carbon Co. Id.

Collect ceph. fm Stanton from the  
Benton of the Colorado.

Sugn River station } Green River  
Hansford " } loc.  
from this place drive to Fossil.

Lebon's creek, Old Hazen loc.  
Look for plants.

# General section.

Archaean.

Paleozoic. Camb. & Ord.

Red beds Trans.

Marine Jurassic in Freeport, etc.  
Fresh water Jurassic

Dakota sp. n. Plants. Gachs.

Midway, marine.

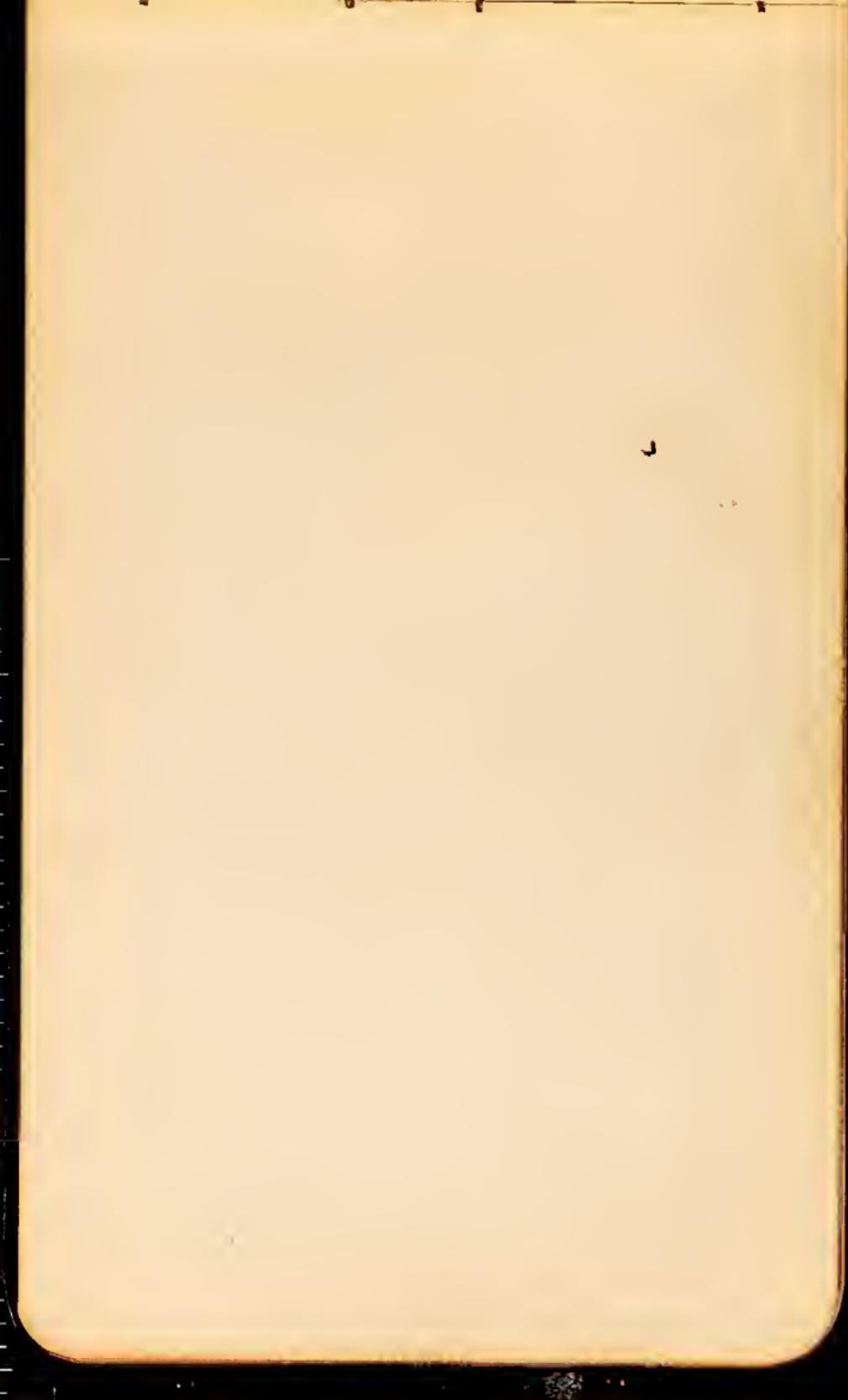
Colorado { Benton, marine  
in shelf border

Montana { Fort Pierre, marine  
Fox Hills marine 7000

Laramie { Upper Laramie } fresh w.  
Casper beds, 7000  
Denver

Eocene Green River

" Bridger mid in West.





July 16-1899 Sunday  
Left Washington 7.20 P.M.

July 17. Monday  
Arrived in Pittsburgh 7 A.M.  
" " Chicago 8.45 P.M.  
Left " " 10.30 P.M.

July 18 - Tuesday  
Arrived at North System R.R. to  
Omaha. Arrived there at 7.45  
P.M. Left 4.35 for Saranac

July 19 - Wednesday.  
Arrived at Saranac at 10.50  
Spent most of the day at the University and  
later drove around a little with Belden  
Callahan & Moore. In the afternoon there  
was a meeting of the Anti-Salutary Society.  
Prof. Abbott was elected temporary  
Chairman and Prof. Barbour temporary

as secretary. A committee was ~~selected~~<sup>appointed</sup> by them to choose officers on the expedition.  
The Com. Committee of Hamback, Knobell  
Barbour, Knobell and Schuchert. They  
appointed the following officers, who ~~themselves~~  
~~themselves~~ were elected by the assembly  
without opposition.

Director and President

W. Wilbur C. Knobell.

Secretaries

Collin Coffe

Van Norman

E. H. Barbour

Reform & Natl Pol.

not present H. F. Osborne

Ref for Divont the " Merriman

H. Hamback

C. Schuchert

Ref for Geology

Ref. for Petrography

A. Q. Lawson  
A. R. Crook

Ref. for General Geology

Fred. B. Pick

Bradhead.

Ref. for Physiography

B. Slope L. Collier

Ref. for Botany

C. Cannon

Photographers

R. Q. Meissnerback

H. G. Cornell

In the evening there was a reception. The Pres. of the University spoke and a number of others, etc. attended the with over the 1 min. Many all the prominent journalists spoke.

July 20 - ~~noon~~ 11 a.m.  
Purchased a few things in the  
morning and made up my mind  
to go.

Paid Dr. H. E. T. 81<sup>00</sup> on the cabin  
bill and understandingly that he will  
rebate of 2d. on & take the entire  
trip. Later in the day learned  
that the start will be made  
tomorrow morning.

July 21 - Day. Camp I  
After a great deal of talking the  
men started at 10 o'clock. It is  
very hard to keep himself with a great  
deal of bad management and  
finer. If there had been a  
start.

In a general way we go north-

and come on the other side of the river

westward over the top Laramie plains  
and the Big and Little Laramie river  
to a place called St. James or 7 miles  
lake. Prof. Wright lags behind and  
no one knows the steaming stage and  
finally we go into camp without him.  
After another scramble and a wait  
for something to eat he turns up.

We came about 18 to 30 miles over  
a rolling and generally dry country. The  
country is a desolate one, no farms and  
probably a house every 5 miles. The plain  
is a sparsely grassy one, with cactus  
and ~~here and there~~ <sup>and</sup> gushing holes. At one  
place 7 miles from Laramie there was  
a vein of quite <sup>and of Sacramento, like</sup> wet <sup>and</sup> country.  
The heat during the day was great sand  
heat wave, very extensive accompanied  
with considerable damage effects.

At the lake took one of the party collected  
Fort Pierre 10 miles and collected an  
Inoceramus from the top of the hills said

to the Fox Hills.

July 22 Saturday. Camp II.

Started at 5 and had breakfast at 6.  
Started along <sup>from</sup> Alkali Camp " at 8. Rose  
3 miles over the way and arrived at  
Copper Creek Camp at noon. Distance about  
about 11 miles <sup>of rough timbered trail</sup>.  
All the hills in this region are  
Fox Hills from which have been washed  
down a great deal with a layer of  
granitic rock & boulders of considerable  
size. In the Fox Hills wean down these  
boulders have come all the slopes. At  
first I thought the boulders had been  
deposited on the Fox Hill sandstone  
but further observation and consideration  
did not uphold this.

Very cold and overcasting in several  
holes (S. James) which appear like sinks

Prof. Knight says that the Niobrara below  
is largely cavernous which affords the sink  
idea. The Fox Hills is porous and the  
water gets down through it carrying away  
parts of the Fox Hills and therefore a sinking  
of the ground. Of course all rocks on the  
Karamie Liens are not sinks but most  
of them appear to be.

In the afternoon about 30 of us  
collected Fox Hills fossils. I gathered a few  
of the rare forms. No crinoids are very  
abundant. All the fossils occur in nodular  
masses which when unweathered are very hard  
and blue in color. Otherwise their color is  
brown and lighter colored. Found a  
bryozoan and a coral among other things. Of  
the latter Mr. Linn gave one good  
example.

July 23 Sunday Campsite

Camp of yesterday remains unbroken today. After breakfast drove over to the first hills of the Medicine Bow Range and climbed to the <sup>top</sup> ~~peak~~ of one small <sup>near Copper Mtn or Coal Ridge</sup> protuberance about the same. Here we found snow (about 10,000 ft above the sea) and had a grand view of the Laramie plains with St. James and Copper Creek in clear view. Other taller, ~~and~~ smaller ones could also be seen and in the far distance Laramie Peak stood up. Distance about 50 miles.

Laramie Plains is by no means a plain rather considerably cut up by smaller streams & rivers. It is a treeless tract but towards the mountains Copper Creek and Rock Creek bottoms are very narrow with small meadows and other trees. The mountains are thickly wooded

with conifer; quaking aspen etc. Flowers  
and beautiful ones abound everywhere in  
the vicinity of springs, creeks and rivers.

The mountains are made of crystalline  
and eruptive rocks supposed to be of Algon-  
Kian age.

I had a long talk with Prof. Knight  
and one of the geologists they mentioned  
is the west the base of the Cutaceous strata.  
by Lawrence in sand 7000 feet,  
" and a similar thickness for the  
Fox Hills and Fort Pierre. The present  
mountains are Post Cutaceous since they  
break through the Cutaceous deposits.  
This is the opinion of Prof. Knight.

A more intricate structure at the elevation of  
the Medicine now & Lawrence Buts is high land  
area with rapid erosion and deposition in the  
narrow can between the mountains. Still the  
introduction of the Laramie then came on, the  
physical change beginning with a great conglomerate  
with boulders as large as a man. This was

also an introduction of fresh waters. The  
limestone is of the same age as the Med-  
icine Bow limestone but is older than  
the Coal Hill limestone of the Ogallala.  
This is also the beginning of the  
Cenozoic. This division is well in  
confirmation in the fact that a fauna in  
one finds Carboniferous Permian rocks.

July 24 - Monday. Comp. III.  
Left camp 7:15 A.M. and started  
for Cotton Creek Coal Mines where we  
arrived at 11:6 M.<sup>Distance about 10 miles</sup>. The lignite is very  
thin a few inches in thickness and the  
creek flows along the bed of the valley.  
Dug out.

18 to 20°

3' Shale ~~limestone~~ sandy, out  
~~2 1/2' yellow limestone~~  
tree stumps sand  
6' ~~thin leaf horizon~~

Shale  
- white  
finest lins.

The leaves have been drifted to this place since all are in fragments. The most perfect leaves are from the surface sandstone.

The leaves in the main horizon are from a buff thin bedded shale and are completely weathered one above another. ~~So that~~ <sup>at</sup> this imperfect condition and their abundance with fossil value in the way of selection can be secured.

The lignite bed in the lower part is a shining black light, material becoming more impure above. The following shale horizon a composite of a number of bands of bright yellow with brownish streaks passing alternately into the buff bed horizon. This is followed by a seam of whitish more or less coarse sandstone, sometimes with small pebbles, from 2'-5'-6' feet thick. Then follows another brownish bituminous layer about 3' feet thick with thin interbeds composed of more or less coarse sandstone yellowish in color and often streaked by brown stains.

At 2 P.M. left Cotton creek and  
at 4.15 - pitched camp on Rock Creek about  
one mile <sup>up</sup> from the new A.P.R.R. cut off.  
<sup>Distance about 6 miles.</sup>  
W<sup>ards</sup> our way to this camp for the last  
four miles we came down the valley of  
Rock Creek. The valley is several miles  
wide and in one black hard layer of  
limestone are seen on both sides of the  
valley dipper in opposite directions! Rock  
Creek therefore has cut its valley down  
through a layer of the anticline with the  
dipper S. N. more S. dip about  
 $20 + 25^{\circ}$

After arriving in camp walked S.E  
up over the valley ridge from camp and  
came across thin outcrops of sandstone.  
The first one is about  $3\frac{1}{2}$  miles away and  
starts out in big mounds of iron-stained  
sandstone. In this a mile west of a  
very large drumlin and one of the

Prof. Peck's man

men found a red sand which I took  
but didn't see. The next sandstone S.E.  
is not fossiliferous followed by a thin  
layer which bears numerous small fossils along  
with bivalves and brachiopods. About  $\frac{1}{3}$  mile  
from S.E., there is a very prominent outcrop,  
which I will examine tomorrow.

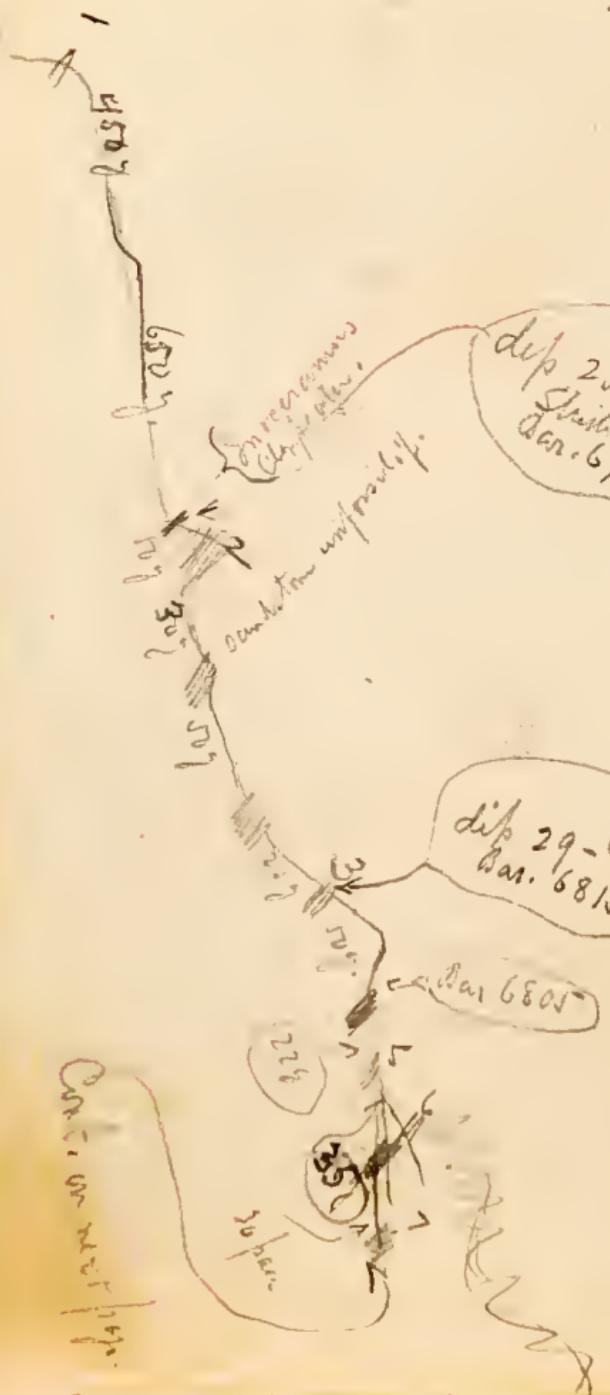
Rock bed shows clearly on a long  
plane it is rounded. On the steep side of the  
hill there is low bluff there on the  
northern side most precipitation with the  
creek wandering through its alluvial  
bottom. On the higher terraces no alluvium  
can be detected. At different times this  
stream has cut down its bed ~~to~~ to  
a stationary level where a large of time  
ago took place an old <sup>ancient</sup> cut.

The ancient water line again shows the  
old, being offset by the Henry sand and in  
places the sandstone is tilted back to  
allow a cut in.

Red Creek

Low creek flood plain

July 25 - 1949  
Camp III.  
Tuesday.



1 Thin water, with locality

2 Shandene sand. Two small sets. Contains oysters, very large bivalves, Ostrica, Cardium and other bivalv. Starfish, trilobite

3 A thin layer from which mostly the fossils collected below.

4 Gasteropod layer. 3 bands ~~20~~ yards wide.

5 Limestone margin. 20 yards from thick.

6 Laid over layer 45 paces thick. <sup>Twenty</sup> feet above the base of the Cretaceous. <sup>On</sup> at the margin associated with layer 7 the fossil. ~~Limestone~~ <sup>limestone</sup> containing limestone wavy layers. <sup>On</sup> <sup>the</sup> <sup>margin</sup> <sup>of</sup> <sup>the</sup> <sup>limestone</sup> <sup>margin</sup> <sup>is</sup> <sup>the</sup> <sup>limestone</sup> <sup>margin</sup> <sup>containing</sup> <sup>limestone</sup> <sup>wavy</sup> <sup>layers</sup>. <sup>On</sup> <sup>the</sup> <sup>margin</sup> <sup>is</sup> <sup>the</sup> <sup>limestone</sup> <sup>margin</sup> <sup>containing</sup> <sup>limestone</sup> <sup>wavy</sup> <sup>layers</sup>.

7 White soft sand. Bill Polson Lava, conifer boulders. Only boulders. Then bedded sand. Lignite in places in the 20 mm. Shales. Some beds broken off market.

From forward port.



July 25 - Tuesday. Camp. III.

Resumed work this morning on the same  
beds of shale yesterday.

In the face of the creek bluff (locality 1) I  
noticed oyster beds.

Locality 2 is at the base of the most prominent  
sandstone ridge and contains oysters, large  
top oysters, Glyptostern? now in Lafayette Coll.,  
Pa. (by Peck). Many species do not appear to be  
present. I have three or four.

I have specimens.

Locality 3 contains a number of small specimens.  
Locality 4 we named for "Oyster Lager"  
although it does not have numerous oysters.  
I have specimens. I have made a number <sup>this for you</sup> of them in a

Loc. 5. Ammonite Lager. This horizon a very  
thin one fossil and has not only ammonites, bivalves,  
Baculites but also placenticula, Pyriferous  
and another genus of bivalve. Fine large gastridites  
occur here! Prof. Sartor has the best  
specimens in his collection. Gammite occurs & occurs  
in other rocks especially in the lower part of the

important - than include a number  
of layers since they closely abut on.

Loc. 6. In a bed 1 m. of soft  
limestone layers not nodular. Star Cardium  
is the dominant fossil. In this zone a few  
shark's teeth were found by Prof. Lawson  
and one by Prof. Charlton. It may be near the  
zone that we took the nodular  
Plesiosaurus; we also find the starfish from  
another horizon.

Ninety acres above Loc. 6 on a thin  
lime band likely to be separated by a  
thin layer of fine-grained sand and scattering  
fragments of the latter a few feet below.  
Prof. Lyell collected it here for Mr. Snell. This  
is the most important find of the day  
and was made by Prof. Brown of Morgan-  
town, W. Va.

Loc. 8 a quarry 1 1/2 miles south of the  
plant horizon and has numerous layers of

oyster bank see nothing of importance.  
Loc. q is the most southern and here  
make a vertical escarpment. The layers here  
are a very soft sandstone and sandy shale.  
Back or more south of the ridge are layers of  
impure limestone at a lower stage <sup>near</sup> five  
feet thick. Here various fossils found leaves  
the tree, which Cobbe of Beloit has a  
large palm leaf, I think. Prof. Knobell  
has others and tells me that he has seen  
several species of Conifera, fucoids, Platanae,  
Ficus, and Juncaceae.

Prof. Knobell says that the horizon or  
most of the fossils collected is debatable since  
it is on or near the horizon of the Fort Pierre  
and Fox Hills. The latter he says continues  
north here and the marine fossil horizon  
1½ miles across the strike begins my  
station or loc. q. The Fox Hills lie about a  
7000 feet thick.

A good collection you made Mr. Andrew  
Kempf and will go to Burtonus Adolphus.

Oulu, St Peter Mnn. Inside some  
lump of the Committee you in party can  
see a fine form Social and the  
other institutions not listed by me which  
are per Tre. G.

The Ban. on the Durcana, layers mapped  
up on the 25 belong to Prof Wright. Knobell in  
+ return the same to Prof  
Wright. (Later he asks only for a report)

July 23 Wednesday Camp III.

Started out with the wagon to collect  
blue corn III and the 11<sup>th</sup> of July a c  
laim on the train near Sora, broken  
one wagons, one lost, one in vehicle +  
going back and when we finish each  
train a day or like that. The  
train - We are not with them.

The only they do care now a very

west of Pine Ridge  
prominent modular ridge with very large  
concretions, some of it inches in diameter.  
The rock can't be from higher than  
the Mississ. For one, and when the rain  
was half inch heavy and the rain  
reflects very brilliant in fact none or than  
I have ever seen.

Dr. F. A. Smith collected a bone in  
the Dog beds near Harper on the N.  
R.R. road. It says is of a *Styracosternum*  
*leporinum* with the outer edge concave, very  
porous with all the structures visible.

Aug 17 Thursday Camp III.

Very fine a day. This morning and a part of the forenoon we were up. We were in very bad condition, my mother had the rheumatism. I have no jacket. And I have suffered to dinner, of course, the coat is backed.

We broke camp by nine and started at ten. At noon we take lunch at Thornton's ranch on the bottom of Rock Creek. Here is a fine example of stream meandering not less than 8 loops in a half mile of meadow bottom. It rains again quite hard by one and near two we have both sun and rain.

In approaching the highland before we enter the prairie country we see flock after flock of antelope. They are in herds of from 8 to 72. Thirty-one

own country by Sam Norman and others say  
so. He also saw two isolated Elk. A  
Jack rabbit and occasionally a coyote  
come into view.

At six we camp just S. of the N P R.R.  
station Warren with a mile more to the N. of the  
R.R. and the Comr. Warren Bluff to the  
S. Distance from last camp about 17 miles by road.  
While the cooks prepare supper I go S.  
to the Comr. Bluff and soon find Ammonites  
and Belemnites.

Other members busy on Dinosaur pag-  
ments and one with a left arm.

Larson found the body chamber of the  
Ammonite from the Truxedo Butte sent to  
Hawthorne by Knight.

Edgar of Detroit found Gastrote like shells  
associated with Ammonites. These are in the  
Baptano dome.

July 28 Fri Ag. Camp. IV.

(After breakfast spent the morning on  
Lower Bluff. Found fragments of flint and  
bones on the Red beds and in the green shale  
unmixed above but nothing of value.

Collected some marine faunae fossils  
which one gave me and returned to camp.

In the afternoon drove back to the  
end of the road where the river which can be  
seen was a fine anticlinal. Here the arch is shown  
in the Taconic 2<sup>nd</sup>. Hill on each side the stream  
defecting southward about 25° but northward about 65° Today  
met with a high low bed of the base of which is  
the W.P.D.R. At this section we see also the  
Taconic 1<sup>st</sup>. The arch and the curvature of  
the dome is visible. Farther to the west on the road,  
we see the same in its numerous meanders.  
Patches of limestone show the anticlinal at  
this section. We intended to follow the  
Taconic 2<sup>nd</sup> but could not proceed.  
Drove up at noon and down again

Aug 27 of black Styrocline a shale of nearly  
615

When I returned to camp found that my  
tent had been deluged and my today swamped.  
Prof. Knight brought me his boat and we slept  
together.

There are numerous places for the same species  
and would be better believe that careful examination  
would be result in nothing. Sawin made a  
specimen at the water end and turned it over to Stimpson  
who will stay to dry it out. Castleman also found  
a specimen in the sea beds, the largest however.

Aug 28 on my way to Green River - saw again the  
Comanche Bluff. To the east of Aurora Station  
several miles one sees much of the Ft Benton and the  
Albertonians before begin to appear in a very low  
bluff. In one instance extending along the ridge  
the strata rises higher and forms the "Comanche Bluff"  
and lower are lower strata in which  
make their appearance. The track road road cuts  
through the Cretaceous and reveals the strata much  
as shown upon diagram. The area continues to  
the west - G.H. of medium time.

1965-1966

Canyon  
Shallow  
H. Hutton  
Laramie

Brule

— — — Fault

4.5 km NNE  
Promontory

5.0 km E  
Sediment

(Cretaceous)  
and in some places

Amo Bell' win  
myself like

the  
Himalaya  
range

Thick white  
ice, white  
ice, white

19<sup>th</sup> June 1899 Vanda.

Came back from Vanda with 1000 gm.

July 19<sup>th</sup> -

1996

Wimberly's  
Vanda

For sale

Wm. W. H.

1000 gm.

Sail November 21 A.

Eastern L. &  
July 29-99

All  
water

1. Red sandstone and sand hole 20 feet.  
Capped by white sandstone

20 ft  
dip  
direction  
unit.

Red beds  
estimated thickness 15 to 20 feet.

Lightest heavy reddish ss. cross bedded with  
thin, 20 feet

Red shale 5-7 feet  
Thickness about 10 feet } light sandy-patty but  
Red clay 8 feet } more clay than the N.Y.  
The clay 15 to 20 feet  
Red shale 4 ft.

Thickness 20 ft., dipping into thin, light yellowish cross ss. 22 ft.  
Slightly clay lamellae at top. 3 cm. of lamellae.

Breccia to Buff sandy shale. Depth: from surface to  
base for small valleys 20 ft.  
Sediment - limestone horizon.

limestone  
minerals  
and rocks

Buff coarse heavy bedded ss. about 10 feet.

Buff <sup>2nd</sup> fine sandy shale. Bedded down below it a few feet.  
With thin red ss.

Limestone.  
This coarse ss. 5 ft.

Ditto to general sandy shale about 10 ft { Sand & Bell.  
Main limestone horizon.

Buff white Buff ss. 15 feet.

Breccia shale and bands of thin buff limestone  
Cyanophyte concretions. 20 ft. or more.  
The lower ones broad and the upper narrow.

For 100

metres

over

July 29-99

the morning

Westerly

Cloudy  
wind  
moderate  
overcast  
sun hidden

variable

Buff-tailed  
Red Sashetan

water not dark  
blue shade with  
lighter soft shade on  
the side. Towable. The tip of the  
tail often intercalated  
in a hole.

Blue-tailed  
Gull

Piping

Lat.  
white bellied  
black wing tips  
long legs

July 29-99 Saturday. Part IV.

Started at 6 A.M. and after breakfast made the section of the eastern end of Custer Bluff

Broke camp at noon and at 11.45 arrived at Med. one, now on the H.P. R.R. After looking over the village and its beer saloons and country stores drove a mile to the Med. one now known when we had dinner at half past one started for our night's camp. Paying freight and telegraph station to adjust tickets for the returning party and less than half an hour we had gone on the road trail. After looking around in an hour or two saw freight riding 3 or 4 ml away in an opposite direction. One of our horses was quiet till then and then he exploded <sup>forth</sup> "Bene vale" on the other Indian, some miles from Medicine Bow.

In on trap <sup>and went to</sup> to the camp where we saw one of Osborne's traps with no photos of it.

My observations at Custer Bluff show that the Indians here are somewhat at Custer

ious through it in, and is  
about 106-113 per cent in marine fauna  
170% ; the first ratio however 135-150  
per cent has added certainty. Yet the  
Cretaceous ichnofauna is not the  
same as the track flora type, Cliffs Bluff  
or even 478 feet. Estimated, however in view  
of my friend Broadhurst's measured section  
& see no reason, in assuming that the  
Cretaceous is all fresh water since Smith  
says he found in the fluvial sandstone a  
marine bivalve. If this is true then the  
Cretaceous Cincinnatian bed have marine shells  
the absence of which. The absence of a marine  
fauna in these rocks is the strongest argument for  
the post-glacial origin. So if the shell mass  
is of recent origin.

The lower Melcombe iron river  
and flowing on to Cliffs Bluff another anti-  
clinal cuesta with white wavy bit o  
and orange colored shales. I have taken  
no fossils yet but

time photo sheet may help to show this structure.  
This region is a splendid one for structural  
geology and splendid models can be made of it  
for school purpose. Talk to Balchett of this.

July 30-99 Sunday Camp V and VI

After breakfast walked over the Dinasie  
Hills near Camp on the Little Medicine at Nine  
Mile Crossing. The coral like things I saw all  
came from the <sup>top</sup> of the main horizon just  
underneath the <sup>bottom</sup> limestone horizon. Belemnites were  
a little lower and below the main belemnite  
horizon I saw the selenopods.

The section here is the same succession  
as at Custer only that the beds occur in two  
hills which make the exposures more accessible.

See brachi cam / and since 9:30 AM,  
arrived at the north-western end of the Tugge  
Out Mt. beside a road coming by 2:30 PM., 12  
miles by road from "Nine Mile crossing".

After lunch started up the hill rock

Section of Village Art Museum Jan. 1904. Comp. VI. Ad. 30-1164.

100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

Andante

8

A 20-75 feet sec.

This is a picture which was sent to  
distinguishable by the borders. A place  
of some importance, I am told, the  
name.

Der Kultus.

卷之三

going on - the Nodita conglomerate. After passing over the cut went down into a valley which ~~had~~ has the fissures not you and on the other side the Lapota conglomerate appears <sup>(I never got this)</sup> the first piece of the bed <sup>of the first piece</sup> I carried down the Freeze Out Mts. passed down the valley north and west in the great valley westward. Here my attention was attracted to large masses of sandstone. I then concluded to climb the ridge up the valley and made the section on a narrow ridge. I was greatly surprised to see that here the <sup>upper</sup> fissures go in instead of out, the thought has at least 50 feet of heavy bedded sandstones.

Here as in the marine limestone Mts. it only. The beds, mostly tabular are all in the section on the horizon. The thickness we always the same as at Iron Cliffs. The characters of rock and fossils also, so called just with deposits are different.

July 31-99, Monterey. Conf. XI.

Started boat over Tuleyo Creek Bed with Lawson  
and Cornell. Reviewing my section of yesterday.

In the top slope of the dome beneath  
Tuleyo Creek Mt., near the first sea, at beneath  
the end of the marine zone <sup>in the Red beds</sup>, collected a number  
of small fossils. This forms the rim of the Amphitheater. These are in the Ab. Triassic.

Lying on the slope and looking back to Tuleyo  
Creek Mt. one can see the state arches from the north,  
east and west. Along the western <sup>and northern</sup> sides of the  
arch - the upper part of the Dinosaur horizon in  
large part consists of a thick sandstone  
and on the eastern slopes there is no  
sandstone in this zone. The distance across from  
east to west cannot be more than four miles and  
yet there is this marked change.

All that I have seen proves to me that  
the Dinosaur horizon is ~~salt~~ fresh water  
or in. It lies conformable upon the marine, <sup>and</sup>  
conformable beneath the Valdosta, which includes  
(continues 2 pages on)

The section and the one's below, in table  
along a small cut with line from Trege Holt well. Both  
wells.

Probable thicknesses  
of beds measured  
Run to Campfield Creek.

Surf. - 7475 Bar.  
Sandy limestone with  
small irregularities.  
7 to 8 feet Stamford.  
Trege Holt ss. 1.5 ft.

IND Bar.



Rally rounded. Red beds seen a place

4.6 M.E. 160 cm. thin  
yellow greenish bed.

At cliff. In air.

2075 Ans. Lignite

shallow

2075

Rising

R. 171.

Top 60 ft. N. H.  
Dredged ss.  
100 ft.

This  
is  
the  
top  
of  
the  
Trege  
Holt  
beds  
about  
100  
feet  
above  
the  
Trege  
Holt  
beds.

\* Below the Triassic rim capped by limestone  
there is a very wide and long valley probably not  
less than two miles to the gulch at the base  
of the high hill or mountain. The thickness  
of the Triassic beds in the valley amphitheater  
may be considerable since an one  
fairly southern one rises and helps over many  
more bedments. <sup>inches</sup> ~~inches~~ make a  
sandstone. The thickness may be not less than

The dip of the strata in the valley  
then continues up over a very high hill or  
ridge not higher than Fray Cut Mt. I  
could find no place on this out exposure  
lower strata than those in the gulch but  
and possibly a thin lower and possibly  
Paleozoic rock can be seen.

Lanson found a foot well here along the  
western side exposing at least 1000 feet of thin coarse  
sandstone with a thick limestone layer. This sand  
may represent Carboniferous.

(Continued from 2 page back)

page contains a marine vertebrate. The nature of the sediments, and particularly the changing condition and the whitish sandstone a evidence for littoral marine deposits. The dinosaurs are found sometimes as if mixed and again but no nests or bones, broken sections occur. Broken skeletons or nearly whole are rare. Some of the bones show gnawing. The only evidence in favor of the sea seems to be the absence of marine life but fresh water life is also wanting. On the other hand if we hold these beds to be lake beds we must admit a lake encroaching on the sea followed by another littoral sea deposit. The latter seems a admittable but the former an even more likely.

Returned to Camp by five early morning  
today about 14 miles.

I understand I have to break the following  
order in trying to find out of the region for  
dinosaurs. Osborne from New Mexico County

Knight, Hillister and Fife collected on the  
Freezeout Hills and the Carnelian people  
in this vicinity. Five parties.

August 1-99 Tuesday. Camp, VI.

After breakfast started out to the west  
on the Freezeout Hills to Knight's Gis-  
taps. Collected all the morning in the  
Marine limestone.

In the late afternoon collected near the  
top of the *Glyptothorax* beds at a locality  
discovered by <sup>just back of</sup> Knight and Barton. A thin  
thin stratum (6 inches) yielded fossil shells,  
2 species of *Unio*, 1 *Unionid*, 1  
*Physa*, and possibly a fragment of *Croco-*  
*diletoidea*. This is an important discovery since the  
beds are all the age range of marine  
marginal deposits. Collected a number  
of specimens. Mr. Barton will work  
out the fauna.

A number of the fossils found

Ammonites. - we are and the "iron"  
seemed one, and we had 3 smaller ones.  
I believe the iron all to be ammonites.  
I never found fragmentary ammonite  
bones.

For our life has 3 claims on this  
quarry bone of which shows bones 1000 feet in  
length. His main man is said to be 72  
per month. He will not touch the sea  
more than ~210. I don't believe there  
would be difficulty to locate bone here  
but really the best arrangement would be  
to go back working with Kniff. He  
expenses real and about 150-1000 dollars  
per year. The bones when taken out of the  
ground are practically cleaned but again  
part together. The excuse to secure  
a bad dinosaur collection need not  
be excessive.

Saw Martin today off Hillstrom's party.

Saw Martin today at Biddleton party.

He tells me he found 2 Cuttaces birds this day. Willson is to have first pick and then Martin is to write up. Our opinion is in Burlington.

There is every appearance that all the beds of the Fudge Cat Hills are of very shallow water since many of the holes are siphon marshes. Such have been seen many in the Rice beds where the limestone is also siphonic. Some have been seen in the Dinosauus horizon.

The transition from the marine to fresh water, from a gradual one and not dissimilar on those hills. I cannot believe there was a lake but rather an arm of the sea which was filled up and became a fresh water moran due to stream beds flowing from a high land. With the introduction of the Bald-tit there is a physical change and introduction of warmer conditions which extends through to the beginning of a warmer time when it was about at this region.

August 11. In my section of an  
Irrege Cut Out. measured 2000 feet.  
C. T. E. isiphins. Dip about 10°

1. talc ass. about 70 feet

Base not seen so that layer below may  
be a little thicker than can give.

2. green shales with 2 layers of limestone  
Furrow shell limestone  
each about one foot thick. 85 feet.

3. thin bedded sandstone 200' 15 "

(4) massive white ss. 160 "

5. sandy grey to buff shales 20 "

6. light grey shales ss. stiff matrix 30 "

7. grey shales, Laramie Tr. 40 " 200

8. massive white ss. 110 "

9. grey thin bedded ss. 30 "

10. grey variegated to ls. shale  
and ss. 70 "

11. massive fine lime and fossils. 8 "

12. amorphous material.

13. the bottom of a glutton, grey

Aug 2-94 Wednesday Camp VI & VII  
Left camp and left Frey But at 7  
9.30.

Spotted two more localities of fossils.

Hancock, Todd, Damon and Culbertson  
left for home.

During the afternoon we found another  
uplift of lava-Trias in which the Triassic rocks  
formed cliffs from 20-30 feet high. The  
structure here is about as at Frey But Mt.  
Top of cliff 11 miles. Below 40 M. from  
McGregor town.

By 5.30 we camped at Sullivan's Ranch  
in Shady Creek near high hills of granite  
and talus. No?

As soon as camp is pitched I start out  
on the hills and find them either away from  
that a certain distance the structure is very clear  
in views. A rapid run of 1½ hours  
revealed a number of strata which I took to  
be Cambrian and the Palaeozoic shales. A  
fault cutting off the lava-Trias

It rained a little during our prepara-  
tion for camp and also during the night.

On 3-9a Tuesday, Camp ~~VII & VIII~~

It rains again this morning and we cannot get away before afternoon. It rains most of the morning so I start out to see the geology. After throwing on the rain it is clear and the succession here is the same as that of the Trege Out Hills only here the strata are more abruptly intersected and the section somewhat lower.

Collected a number of fossils from the Trege limestone which may be called the Freye Out limestone.

It dinner time. The men have shown me Castle points which must be successive (read) in time. We had a fine confirmation by var. P. due to small corals and

Madison limestone. We will go there for  
cattle and farm work. Products same as we  
have.

## Lemhiola.

Our camp is pitched near the base of Shirley  
Mts at Sullivan's Ranch. Just back of camp  
about 1/2 mile is Saw-tooth peak taking its  
name from the mountain having a sandstone  
ridge which gives it a saw-tooth like or  
serrated. Shirley basin includes one thousand  
square miles between the lava flows. On the  
one side are Tertiary on the other. Above the  
Tertiary plane we see a flat topped Mtn.  
locally known as Chabell Mtn.

Mr. Sullivan says Trap Cut got its name  
from the time when Fremont crossed  
through here. He camped during the night  
in this Mtn and there lost some of his men  
by freezing. Therefore the Trap Cut Mtn.

We leave Sullivan's by 2 P.M. and arrive  
at the end of the valley plain by 7 P.M.  
This afternoon we travel along the Shirley  
Mts passing the last of the Tiberius ~~and~~  
the Madison limestone and then the granite.  
After leaving out of Shirley valley we come on

for a lot of glam. Here a wet season  
of 1870 burnt about 6000 acres.  
Now a low hill down the Blue River  
rests on a large granite rock.

McCook, Aug. 15

The stream monsoon of the hills  
is still all water holes.  
When he drank he dried up the frontiers  
of your town, which he ate  
the next day in the mud.

On the way back again  
I stopped for him in Wyoming.

I am sure on the 1<sup>st</sup> of August,  
I stopped by a little town, Coe,<sup>Wyoming</sup>, Cedar Rapids, etc.  
and saw by the Total Teller the date  
to the last of the month.

To the end of the hill a short distance.  
The morning by 8:30 after a heavy rain and  
fog we leave following the Creek for about five  
miles. All of this with the sage brush are  
very abundant and every body is out salt,  
the gum. Results about 700 chickens. They  
are very tame and often for a few shots will  
be gone off and before it flies.

We then cross the higher land and by noon  
through granite hills; the Indian Gorge Mts  
where we have lunch. Here another heavy  
rain catches us and by 2 P.M. we start on  
the Little Prairie where we arrive by 5:30.

After having our noon day lunch place  
we ran around the granite hills and up a  
ridge onto the highest Tertiary strata. Here  
I have a rapid view. The granite hills  
and in the distance ~~to the right~~ <sup>the</sup> Ferris Mt..  
Passing up the road we see continually  
of sand and rock out of the sun below  
and of birds. They were all all  
without the earth clay beds. This  
was a very picturesque and mountainous,



May 2nd TX

Time & depth of Tectonics.

Same from photo of this. See A  
they will help out.

Sister

T. 1/2 mile south east

Point plane

North.

Anticline

*Tritylites*  
largest recumbent.

Imbricate

Imbricate  
fault

Imbricate  
fault

Imbricate

Imbricate

Imbricate  
fault

Imbricate  
fault

N.W.

Tectonic  
zone

Carries

Plate 110

Tritylites

Tritylites

Aug 5-6. 1870. Camp IX.

Prof. Knight bid adieu from this camp  
in Galilee upon about  $2\frac{1}{2}$  miles I started  
the afternoon over the Tertiary and soon reached  
the shale condition of the Lower Travis of which  
I took a picture to show cross bedding. Passing  
over 2 or 3 small hills we entered a dry cut  
which rapidly terminates into a canon and goes to  
our view a splendid view of the narrow canon  
of the Plate about 1000 feet deep. Our position is  
above the Cambrian on ledges of Oldonian rocks  
we struck.

The gravel on the bottom of the canon is a  
continuous mass all through a red granite. The  
bottom of a series of thin bedded red, brick  
red, Cambrian shales. On this are several  
thin beds of yellowish limestone  
interbedded with thin greenish bands  
and dolomite with bands of chert. Towards  
the top are also beds of light bluish limestone  
alternating with thin clayey beds but found no  
fossils. This is the base in the yellowish older

over the lower beds of light colored limestone  
of which only one bed has been  
made Mr. Gardner's second spring a "Marlstone".

Over the Ordovician are possibly unconformably  
lies the Carboniferous limestone of the Mississippian age.  
This is all that can be seen in the Canon at the  
point of observation.

In the way back to camp I ascended one of  
the first Tertiary hills and looked back toward  
the canon. The view shows a regular succession  
beginning on the left with the granite and passing  
to the right through Cambrian, Ordovician, Camb.,  
Trias, Lias, and some Cretaceous. All of these  
strata have a nearly uniform dip to the  
right and are outlined well on the horizon  
and in the distance by Tertiary Lake deposits.  
These stretches of river and lake bottom as  
seen from a high Tertiary hill between camp and  
the canon.

In the evening had a walk around town.  
The Lawson hills on the granite have a  
wavy surface and shows no decomposition.  
It had been washed clean of all its decomposed  
material. Over this lies a thick Cambrian clay  
which contains a few limestone layers.

large, about 300 ft., the river is  
concentrated around the base of a low, rounded  
butte, a variety of sandstone.

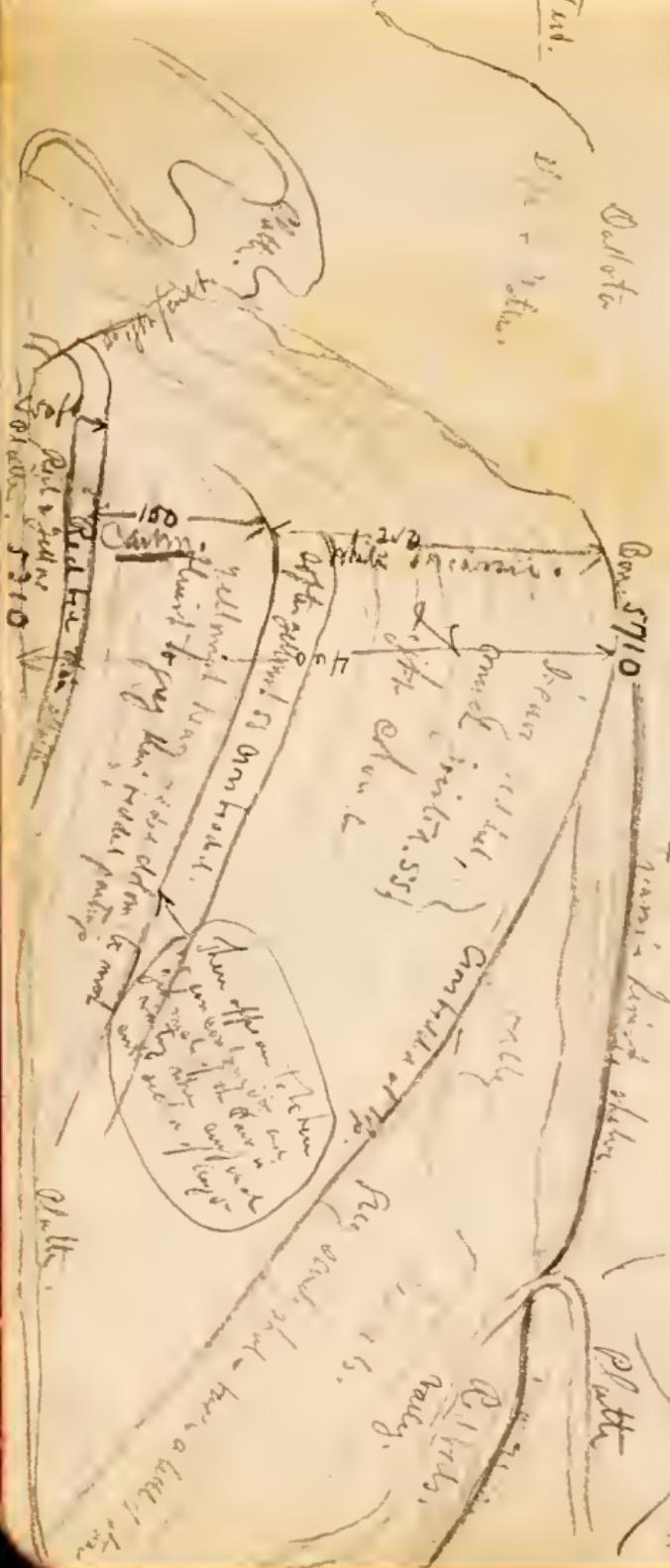
At the base of the so-called Butte Maria River,  
a rounded rock made a large part of the butte  
and a species which is not certain that this  
is a natural limestone but only a continuation  
of a limestone. Since these shales are  
so good in making the Cambrian the question  
of age was this - with the only rocks  
seen are small fragments.

Aug. 6 - 99 Sunday Camp 18.

After breakfast the women took us to the  
little town of the North State about 6 miles by  
road from the camp. Here a little stream  
high in the town up with the strike eastward  
and. The river has cut a narrow gorge about  
but about 200 feet ~~down~~ to the North,  
crossing about 200 feet of white to yellowish sand.  
stone apparently older than the East.

Aug. 6. Visiting Mr. H.E. at new office building corner of H. & Little.

He left him by Dr. Woodford  
the measurements of his limbs.



W-11. *Ph. platyrhynchus* Linn.  
Gmelin. A. H. & J. Linnaeus  
than whom do a N. & S. Linnaeus  
to the north.

These states ~~in an order~~<sup>are in the order</sup> that the ~~mother~~<sup>original</sup> plan had the mother plan.

The shrub is a native of Brazil & Rio

Please give me  
have a little.

Cyathus  
plant. At this point  
no dark things,  
a simple oval gold.

27

Sp. in the shade  
had bird man  
Tom Nighan.

The general structure of this region is shown in the two  
previous sketches. Near the middle of the Can-  
on there is a hot spring in which a very green  
algæ are growing.

Aug. - 99 morning Camp. IX.



Entrance of Little Canon.  
This is a slight differentiation between  
R. Cut & R. Cut.

Section IX - Lake Cava

above Charch & Smith line.

Brule River

W. - 99

E. - 111

Dip 10° N.

to 2'

1' ss.  
1' ss.

May 1<sup>st</sup> 1890  
Day 5325  
from public library  
at 2712 feet

From 10° to 20° N.  
more or less

on limestone  
at 2600 ft.  
greenish sand  
about 20 feet.

black dolomitic

green

limestone & dolomite

limestone

the same layer  
in which  
is found the  
dolomite

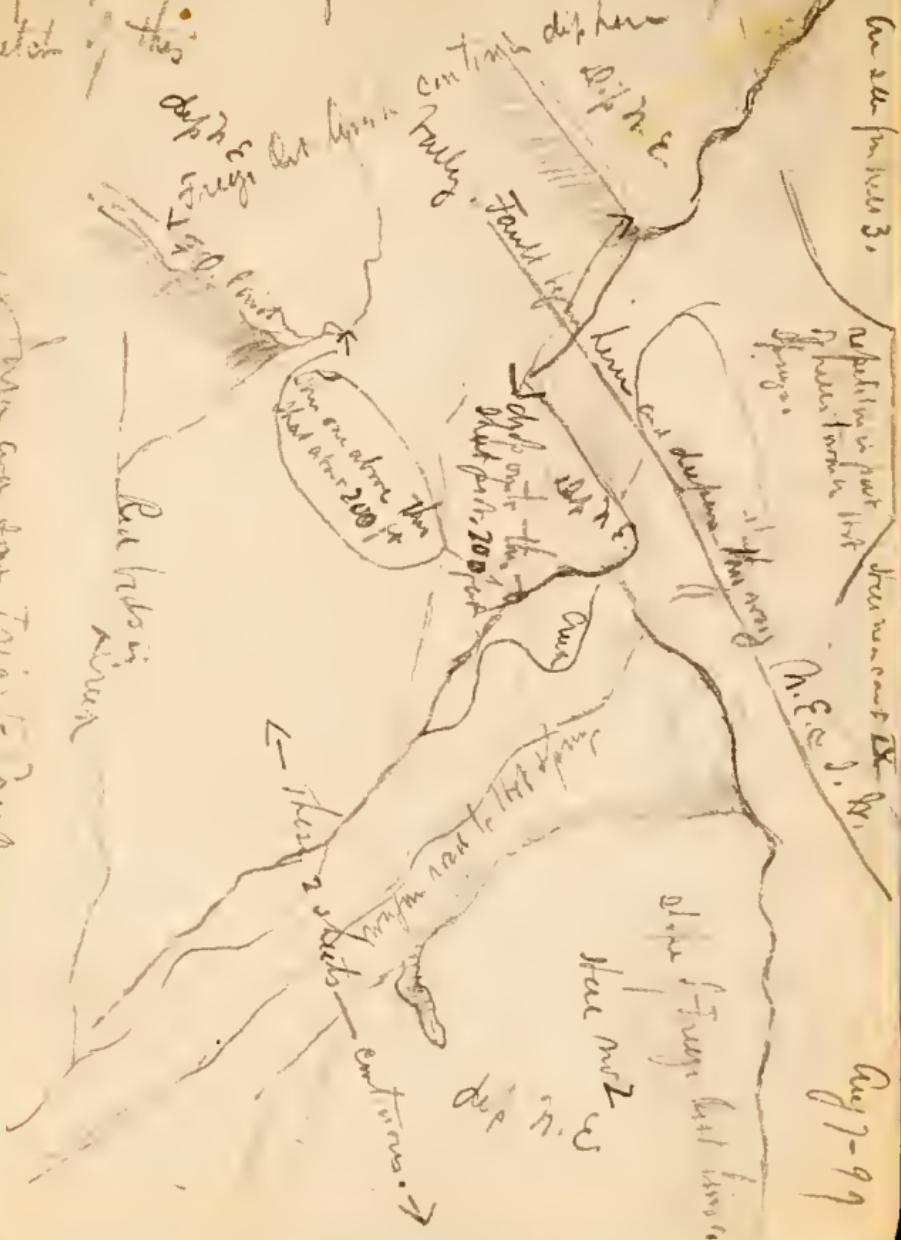
limestone  
525 ft.  
525 ft.

Distance from hills 2 to 3 about half mile  
However much of the distance is along the dip of the F.O. border.  
A little to the N.E. of hill 263 the F.O. border rises about  
200 feet higher. A small fountain here. See the following  
sketch of this:

卷之三

*Published in part by the author*

Aug 7-99



W.M. Johnson

Aug 7-99

Left to continue drift  
at corner

Ship about 10° N. Lat. E.

To all of them we left  
a lead marker and left no  
further down.

Left to continue drift  
at corner

Ship about 10° N. Lat. E.  
Left to continue drift  
at corner

Ship about 10° N. Lat. E.

*Cathartes*

First set of this will be  
within 10 days and then  
if my flight

Batton here in finished and has then  
500 feet the off. The one in operation  
by 1st.

Quarantine

516-  
Dinner  
Baptist  
School

October 75.

200

that he ~~possibly~~ <sup>is</sup> the ~~best~~<sup>1st</sup> ~~the~~

STANLEY

四

11  
1939. L. in with G. & S.  
B. in with G. & S.  
S. 1939.

四百

1900

S. 14

yellow 55  
E

700

Aug 7-94.

In the region beneath Lou-Fay, but Lankster  
There must be at least 400 feet of Red Det. Tawari  
there is a number of thick greenish sand  
bars, here and there the center - when the  
soft bottom is exposed occurs.

... can be said or the factors comes  
into play a lot. one does not in the  
way it seems. He know not quite along this line.

The same outcrop for May 6 little  
changes but the top 20 feet are in shale on  
the Trempell L. horizon. Beams resting on  
one mile on 270° a dip across S to the dip  
about 10° N. Steeply through the sand.

Twenty five miles from Tidley.

Dad - 119 and Th. Section of Barn off Reservation/Ex.

new - made with three  
in one hole - hole not in work.

119 - 119 - 119 - 119 - 119

but one of them is good  
in the other side.

119 - 119 - 119 - 119 - 119  
119 - 119 - 119 - 119 - 119  
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119

119

Aug 8-99 Tuesday. Camp IX.  
Left Sab. the morning for home. Our  
Camp, for now reduced to nine.

I heard a new this morning locally known as  
Sam Roff bird. See Time.

At 9:20 AM started out west knifing in the head of Bear Creek in the M. State.

There is a thin bed of greyish yellow unconformable  
on the granite. Bas. 5675 although granite. Basalt, or  
most likely a sandstone containing ferruginous iron. It's  
a coarse ss. The surface is rough. It's a surface  
of granite being made by the upper part of which  
rather a large amount weathered. Last, Comt. Bas. 59. In  
it's a coarse ss throughout and now the top has  
the fissile and it's often too worn to see them.  
In the following period it's more like  
sand. In some parts. Fossils. Abundant.  
the last mentioned

All above the granite was in conformity.

beginning on the ridge "as with the Bas. 6100  
one descends over a bed of about 15 feet thick of <sup>thin bedded</sup> clastic  
arenaceous limestone.

(In) most part the beds are thickish and thin  
also.

bearing sand & silt. Considering thickness of the thickets is not more than 260 ft.  
and there the base is 5800. ~~at~~

I found some carbonaceous coal at 11 m.s.  
and thick. Coal bed. At the other base of the  
area <sup>from 4 feet Carbon</sup> ~~now~~ <sup>also</sup> ~~is~~ half coal. I saw a minimum, 2  
m.s.

There is an unconformity between the Carbon  
and thick Terciary at the head of the Canon  
there is not more than 260 feet carbonaceous  
while when we saw the Canon base it is  
for over a distance of 400 ft. the house  
includes <sup>orally</sup> ~~in~~ because since there at the base  
a number of *Fenestella* (large fossils and no  
abundance) and *Spirifer*.

At the head of the Canon it does seem  
to be like it, at the head of the <sup>part</sup> Canon and just  
the thickets are in unconformity. It is with  
them the top of the sand at the head of the  
canal canon is wanting otherwise the beds are alike.

At the head of the canal canon a  
entrance one can see the Tertiary land form

apparently composed on Cambrian rocks on the west lies  
to the east on Camb. There S.E. of west on the  
granite. To the N.W. it lies between on the  
Tiras, May and Buton.

The Unite Tiras is very thin on deposition on  
the N.W. Camb. and is often strongly cross bedded.

The faciès of the so-called Cambrian are  
very massive usually in lengths of about from creches  
and one inch thick and high. They lay very thick  
in the Creek.

I have estimated the thickness of beds  
above the Cambrian at 227 feet. It forms a Cambaran  
sharia 47 feet above the limestone. This species reminds  
me of a Permian species. Another one has an  
exfoliation. This rock bed is only 6 feet thick while  
limestone at least 10 feet. This causes the belief that  
there sometimes withdraws the Tiras.

On -<sup>to</sup> 19 January. Cam. IX.

Spent the morning at the mine collecting  
various mineral specimens in the hills around  
and went to Little Camm. Found two  
good modules had it with several others.

The Ammonites occur near the top of the  
main cliff, with the great majority of  
fossils. Those found at the horizon appear  
here sketched in the upper one.

As 10-9 a Thursday Camp II & XI.

Leaving from camp at 6:00 A.M. to the west coast at 6:45 A.M. again drove to the Indian Lodge Inn at 6:30 A.M. Parked our car there, we took a last look back at the Grand Canyon country. Far in the distance are the red ad brown colored butting rocks and in the near foreground the hills are a pale blue of haze. This age, red and pink green color. The Tonto gray hills are sage covered and done in the rolling green & creek side trees above.

In this, as are the Adina Grove Hills, also on the road to L. C. M., two mi. in the valley of the Salt are one stand of cottonwood and one fine cottonwood, the larger one is over 100 ft. in height. Other trees of various kinds are a few young ones like a pine, Juniper, cedar and other conifers.

To the left, body & sarcophagus  
memory: S. Morris Baln of Philadelphia  
Penns., born Sept. 12, 1851, deceased  
by his guide on Aug. 23, 1888. Inscription on  
a granite sarcophagus stone was murdered.

him & he ride a trap who he expect  
in Laramie, he tells him <sup>as far as I can make out</sup> to secure his  
exit. Two weeks later the man was  
discovered ad late at night he was  
drown in the cemetery of Denver. On  
the 10th we to secure a place in the local  
tavern but in the mean time expect this  
arrangement. In 6650. The Socia in the Indian  
Socie met at the town coming at a little storm.

We were all in about from camp up  
to which we have <sup>had</sup> a <sup>little</sup> <sup>time</sup> my Mr. Max <sup>had</sup>  
Ranch.

Aug. 12<sup>th</sup> 1889 Camp

It has a cold night. The east found ice on  
the water bucket this morning. We all start  
for the Teton hills I see now.

Some good <sup>old</sup> <sup>days</sup> in Camp date  
back to the time when we camped in the  
The next day being much of the water

of the night about the mid of transition  
but the bottom excluded me to. So during  
the night Prof. Atherton passed the bits  
of the horses we've been used. Then the  
other but few seconds and when he re-  
solved on the day the horses they smelt  
the bear, were . . . by accident and  
when started up like this that day.

Arrived at 4 P.M. - The Titay hills we  
are on the rim of Paolo's valley where a num-  
ber of clefts intersect us. To the right is  
an isolated peak resembling some of the heroic  
giants which stand on the Cuchiat.  
On the left a large hill rising in a series  
of rounded domes surrounding a temple like structure.  
In a sea of sand like beach eroded out  
of sandstone slopes and surrounded by a thick bed  
of sandy clay soil now scattered down a  
dune of sand 8 ft. It may be called King's  
temple.  
The sun set at say 8 P.M. the sun casts  
long shadows and we see a wonderful scene  
of erosion. It looks like a thousand men

The scene surrounded by the trees  
was, as well as at a week  
ago, with the sun at the back &  
with such golden light that birds were  
visible. These alone sang with the day,  
and the greater part of the time  
with the best singing of the day, and  
I was glad to <sup>see</sup> that the birds  
in the wood were still singing.  
The rocks resulted from  
volcanic action. Some of them  
a rather greyish brown, some like a tan,  
the others much redder. Several  
of them <sup>had</sup> broken.

As I was about to turn up  
to mind the dinner I met a man. He had lost  
his right arm above the elbow. It could  
hardly be called a hand, it was a mere  
fist. He had a gun and a pistol which he  
managed to hold in his left hand.

Aug 12 Saturday. Carp X. & XI.

I rose at 6 am and the morning began over  
start a little. We start at 9:30.

Paid a visit to Mr. and Mrs. H. C. Miller  
in their home, the Ladd & Hardy. Baby  
H. C. is now 10 months old. I am to send him off to Dr. Lee's address  
in my book.

At 1 P.M. we took the 6 m in  
and secured a young male antelope, after  
driving 11½ miles. The animal clattered at  
once. It was frightened from its mother and came toward us  
as we were.

When we took our dinner at 2 P.M., we took  
direct south through the Green Cut with ~~the~~ <sup>the</sup> city of  
Elk Horn with the city of  
over the eastern side of Bates' cut.

At 5 we arrived at our camp place on the  
Refugee River at the mouth of the Arkansas. An audience over  
eastern side of the hill. The place has one small  
well of the Indians. Our water and wood must be  
brought in by hand. Before supper we went  
to see what the Tertiary had come down a turtle  
and other bones. Tomorrow have with a collector.

Gravel	50	50
50	50	50
50	50	50
50	50	50
50	50	50

Mineral	100	100
100	100	100
100	100	100
100	100	100

July 13, Monday Corres XI.

7325

All Tertiary  
overlaid section of the towers.  
(above this horizon can be added 200 ft of sandy  
clays seen in the well in next page)

gravel  
A few 75 ft

7250 by twice

yellowish white soft

clays in tufts.

200 ft with numerous  
tortoise bones and one large  
mammal bone 100 ft.

→ Miocene

Titanotherium

Phycatherium in it

Red granite conglomerate Tortoise bone,

Yellowish brown top

Yellowish white soft clays weathering  
into tufts.

Sometimes

120 ft.

7025

Eocene

Wavy yellowish brown gravel by 200 ft  
and some rocks. Fossils found near center 6975 ft.  
most sand. Sandy fine grained sandstone.  
6750 ft. - 175 ft.

Clayey white clay with molluscs.

so far.

6800 ft.

most likely over 6600 ft.

The Red granite must alone make a bedrock and have  
formed the clays and red pebbles it is a large clay  
and the granite conglomerate is even bedding.

For detail as to the Cannon & Dale's Hole  
country apply to Boney Ernest Ferriss, Dry. He  
lives in this country since 1860 and is now about  
60 years old. Don'ts know his wife.

In the gulches along the inner side of the rim  
grow beautifully, one species Red Spruce (Picea  
douglasii) 100 ft. 60 ft. tall and 2 ft. thick, the pine  
is also abundant, Pinus murrayana. The common  
" sage brush" is Artemesia tridentata, the cotton-  
woods we saw in the Grand Cannon Country are  
Populus tremuloides, & P. angustifolia. Birch  
used in a manner as shade trees. The common  
Juniper we saw or met in the Cannon county is  
Juniperus communis alpina & J. virginiana.  
The red berries little bush amongst the sage brush  
in the gullies here is Chus trilobata. The quaking  
asf we see at Lulu Evans in Populus tremuloides  
and the willow Salix rostrata. Along the small  
streams alder is common (Alnus incana  
virescens) and the mountain birch (Betula  
glandulosa). Bearwood  
Leaf cactus.

12 Grafton

In upper part of valley  
there are large fields of  
sand, gravel and other bones. The soil  
consists of sand, gravel and stones, at  
first seen a lot of small  
gravel and stones near a brook. Twigs  
and branches were scattered about.

This soil was found to have the  
same composition as below.

Below the surface there  
is a layer of sand, gravel and stones  
of which the gravel is the most abundant.  
A layer of sand, gravel and stones  
was found at the age of  
20 feet. This soil was  
the same as above. At the bottom  
at the depth of 20 feet the gravel and stones  
consist of sand, gravel and stones.

In the lake about 28,000 years.

$$\begin{array}{r} 75^{\textcircled{6}} \\ \times 160 \\ \hline 390 \\ 150 \\ \hline 1200 \end{array}$$

Aug. 14 Bar Harbor Camp X.

Top of hill S.E. end 200 Bar. Titon, bed, 7300  
base, slope 1500 ft., 1000 ft. lower hill  
marked 6600.

At alluvium floor ~~200 feet with 200 feet~~ 100 ft.  
Calcareous at top about 10 feet thick. Foliated  
westerly with *Paysa* about one foot thick and then  
argill. 3 feet sandy clay + thin <sup>7500</sup> ~~7450~~  
At the northern end, there seem like fm 200 + 200  
feet more of shale than limestone resting on



The two last outfit say a fine of levels &  
verticals, and I have that the entire hole has  
a depth of 1700 feet.

It will be completed in a week or  
very little. We are situated at 10,810 miles. The  
elevation today is wonderful. In these there are  
many castles the range often rising twenty above or  
a height from 4000 to 5000 feet. These between the  
valleys are the bluish-to-white talus slopes studded with  
silver or hoarfrost many of which have their roots exposed  
as far as if standing on stilts. Collected the following  
mineral new, also some Physa and fossils.

Aug. 5. Tuesday. m. XI & XII.

Left at 9:30 and camped this evening on  
the North side River was 42 miles away. We are  
now nearly at the end of the Tertiary. We struck the  
(? Penn.)  
Tertiary in one of the Laramie ranges.

To the north side we went down and  
at 10,000 feet still higher. At this point camp arrived  
for me at 10,000 feet where he sleep on  
rocks. Some little distance from the camp a stick with  
a nail at its end which scares away all critters from  
stealing lamb. The platform may be too dangerous

a thig for a coyote. She has been some day in discovery this.

Coming over the Tertiary plains today from a place now secured by me. The prairies were very fine. The morn  
is very warm.

Aug 16 Wednesday. Cam. XII & XIII.

I found a little rain this morn and all wet outside camp. After lying out we start at 9.30 A.M. on Box Elder <sup>Creek</sup> on the north side of Laramie Mts. We arrive after a walk of 1.30 P.M. through a small brook surrounded by granitic hills and an abundance of rocks. Distance covered about 10 miles.

The first bear morning was seen on the side of the granitic hills. Our wagons then started a short distance over the sage and before we were aware, if we are on the north side. Granite are about us.

We crossed several this morning in about midday and got here in an abundance of rain for cattle. As we crossed our camp we see remnants of an extensive ranch <sup>once</sup> owned by the Dr. J. S. Miller, who was very. In this region was the Brown ranch. 2nd of the outfit once owned a few thousand head of horses and as many cattle.

Dear

In the ~~near~~ <sup>new</sup> Laramie country in the States Mrs. Johnson & the <sup>old</sup> Laramee Game action a herd of elk number about 1000. The person saw them in the corral and he had had <sup>the</sup> assistance of the latter the entire herd could have been counted. As it was one old buck who could not run as fast as the others showed up which made the horse man dirige a little <sup>with</sup> this the last which all avoided the corral.

It rained a little in the afternoon.

Aug 17 Thursday. Month ~~XIII~~.

Still about among the prairie grasses at ground rising, where herds a few hours ago scattered from me quickly. Then collected again ~~to~~ by about 1 P.M. Found an orchid.

The hills and trees are in clumps almost no more for fallen timber. A first few was seen some time ago - the young timber is starting from particularly quaking aspens and cottonwoods.

Rained again in the evening.

Front along ~~gullies~~  
across ~~gullies~~ after the cottonwood.

Aug 18 Friday. Camp. XIII & XIV.

Started for the Little Mavig River where we arrived about 10 M. on the old <sup>now the John Bennett</sup> Dyer Ranch.

Collected plants in the afternoon.

The hills near our camp have a very coarse conglomerate of granite derived from the granite hills a very short distance away. In this cong. are very much broken bones of Titanatherium. On the old Oñoceno shore line with the beach cement with granite fragments, derived from the cliffs against which washed the sea.

Aug 19 Saturday. Camp. XV.

This morning we started out for "Specimen Hill" about 2 mi. N.E. camp. In some places these hills are covered with small gravel which the Red Man worked to secure his flints, and on the numerous shallows in any depression rough shale. Here on these hills are found numerous beautiful calcedomie or quartz rocks or rather grits along with much magnesia and monzonites, and red Jasper also. All of my unlabelled specimens are from this hill.

On these hills I found Semina, S. sulcata, Eumorphus, Mogulina and

On 1<sup>st</sup> saw Dubray and Mr. Fulton collect  
Spirifer communis, the age of these hills is  
therefore older Carbonaceous.

These hills lie at the base of the Laramie  
granite ridge and lith may be covered by the  
Tertiary. I have no doubts that the moss agates  
which are found in the Tertiary are here as well as  
were derived from the Carboniferous.

In the afternoon I went to the "Red Hills" S.E.  
about 3 miles N. this camp. Here we also found  
calcareous stalactites but more finger shaped,  
he said no fossils but I have no doubts that  
these black red hills lie above the Upper Carboni-  
ferous and maybe either Permian or Tertiary.  
The inference is based on the dip of the Coal seen  
in the morning.

Collected about 400 pounds of minerals today.

Aug 20 Sunday. Camp. XIX.

Packed the stores collected yesterday  
into four sacks.

With letter to Mrs. & Mrs. Stanton, Merrimac  
Hills and Idris.

Duncan brought in a sage trunk about 3 in.  
in diameter which showed 58 rings. This is by no  
means the largest example. Another ordinary sized  
trunk had 38 rings, having a diameter of 13 cm.

From our camp in the back sand, John  
Burnett's Ranch we can see in the southwest  
the Shoshone Mts. and distinctly the Sawtooth Mts.  
near Sullivan Ranch.

Aug 21 Monday Camp XIV & XX

Everyone in busy packing & much collected.  
About two o'clock up, a John Burnett to take to  
Med. man ... 10 in either not here.

We leave at 6 A.M. Have dinner at Sheep Ranch  
by 1 P.M. Start again at 2:45 and camp in the night  
country, Tollie near Mr. Littlespur's Ranch.

All of the time on the west and south of  
the Garfield granite hills when over the Tertiary  
or Paleozoic limestone, and then the Triassic.  
On Sheep Creek the Triassic red beds are present  
in low washes for some miles around. The beds  
are streaked in all directions by gypsum as  
secondary deposits. An acre over again the granite  
hills the Camp of Tears.

Aug 22-19 Tuesday Camp XV & XVI.  
As we retired last night the atmosphere was  
warm & dry but the wind began to blow  
and this morning it is cool and windy. We leave  
Camp #8 and reach Star Park near Eagle  
Creek about noon by 12:30. Our camp is  
anticipating situated in a narrow valley surrounded  
by a great abundance of trees. A  
handful of a few ever situated here but now  
we are in a different.

The first thing I notice  
is many plants first on the higher dryer  
parts of the hill side.

ground and then along the small streams. Worked  
at busy time.

All the rocks of the region are a granite like  
that of the Sierra Nevada Mts. A red granite  
is the orthogneiss. The granite is cut by numerous  
dikes of dark rock. Of the latter there samples.

Aug 23-a Wednesday Camp. XVI.

The night was a cold one, and this morning  
~~overcast~~ was ~~was~~ ice ~~so~~ much thick.

At 8 A.M. we all start out to climb Lazarus  
Peak. The elevation of sun surf coming and going is  
6970 ft at base. At the base it is at the base of  
Lazarus Peak in the west stream the elevation is  
7350. We select a place on the west side of the peak  
where a date has been worked out with granite walls  
in broken heaps and worked on such a scale, I  
found it over land climbing and ascended to 8670.  
Cassim who was with me ascended to 9070<sup>Actual height is 9220</sup>. On  
our return to camp I learned that neither one of  
us had been near the top. Prof. Pen and  
Tracy did go to the top which was about one

Mile station where we stopped ascending. The night before there was measured about 1000 feet of rock. This is the highest point of the cliff. Above fall above sea level 2200 above the Beaufort River.

On the west side places on Lawrence River Mr. Ross found inscribed in the rock the name of "R. H. Ross" October 1889. The name of R. Chapman was found which probably belongs to the same date. On the south side, quite near the name - a J. Ross Gilder, No. Morris River. Other names were Swallen and Steele.

The first - some ten minutes, became dry & then went to the right which had no known name and it was much older than. The granite has all the worn features of it, such as great rounded knobs, after much study one can see some at the Beaufort River over which we passed very through the valley. This one has almost, no signs. Then we had

from mile to mile to camp.

Every one reached camp safely by my time.

I did not intend to climb the entire peak and by an accident I had Ross' lunch which consisted of biscuits and fried Prairie Dogs. We latter were not eaten up the ratting. The meat was very fatty, but otherwise the meat is wholesome.

Aug 24-99 Tuesday. Camp ~~XV~~.

The night was very cold and our rains this morning have ice for most of it.

Immediately after breakfast I go down the creek stream from our Camp about half mile to the house of the beavers. There we can see the dam - we follow more and more down stream to first post or aspen trees and seem to be about root. They cut down the trees from an inch to those - 18 inches in diameter. They are gnawed about 18 <sup>inches</sup> from the ground on all sides of the trunk and the trees stand in any

direction. They are now on their way up!  
Now when the small birds are all settled  
on the ground or the sand, you see they are busy  
on gathering food. These animals appear  
but suddenly will eat the same kind of grain  
they had just taken even so quickly. They never  
stop. They are usually here three or four  
days. They are numerous, always clinging to the  
trees and come out to drink water or  
bathe in the streams. These they like best and  
hopped to the bank, will land on a rock in  
the middle of the stream and bathe.  
In some places there are several Considerable and  
are here just ~~as~~ another tree where they  
will sit and a round, clean <sup>dry</sup> ~~as~~ tree.

The birth camp and 11,830. Shortly I  
met Mr. Frank Draper (Garrett P.C. by way of  
Providence). This man born in New Haven  
- New at 1158 and settled about two  
months north of Laramie with the French broken

who came out from the Kennebec county in Maine.  
He came to Larance Peak about 1875 and  
had numerous encounters with the Sioux Indian  
a number of whom he killed. He also met one  
black scalped and tied up in a skin cloak.  
He mistook him for a soldier. The Indians  
were not then laughing over this in very  
affectionate manner like after the above hunting.  
If I ever went a picnicking in this peak  
I would be sure to keep up this man in the  
memory.

We camped on the North Fork of the Larance  
River near Pigeon Crossing about 12 miles from  
Larance Peak. We arrived here about 12 P.M.

In the afternoon we got a mule team & miles  
east out where we could not get through  
on foot and have a good trap slide. In these  
hills we collect astrotas and furbrits.

Collected a few furbrits.

Our horses were a little fat; so at home  
the second one we have not on the trap, so a

resident on a horse followed me an  
entertained Mr. Cornell and Cameron  
of the University in their company.  
Then with a mule. After University in we  
saw the bare deserts. Then P.C. add me a  
boat. <sup>Antelope Spring</sup> I Barrett by way of Rock  
Creek.

Aug 25 - 99 Friday. Camp XVII & XVIII.  
Left the New York Academy at 9 A.M.  
and had lunch beside a small spring creek at  
12 on the edge of the plateau. After having camp  
on panel a road to it out of the plateau and  
then came to another road. After having this  
Creek and the first one I saw over all of which  
was the Teton.

The miles were measured from the  
camp (XVII) in the morning to the XVIII Creek  
and were to be on the border of the Custer Park  
not far. In the vicinity one also saw a very  
expensive round top. The cattle were

Left together in two large bunches into which  
the cow boys ride and kick out the desired  
cattle and drive it to a bunch forming  
between the other two ranches.

There should be 10<sup>0</sup> on account for sickness.

Our camp is at Mr. Kelly crossing of the Laramie  
River in width and very little to distinguish the  
population of the Laramie plains. We are 25 miles from  
the camp and 166.7 miles from the B.P.R.R.

Aug 26-99 Saturday Camp ~~XVII~~ & ~~XVIII~~.

Broke camp and left 6 A.M. The pack is  
of horses to cross the Laramie River had all the  
magnesia without trouble except the one gun in.  
One of our horses balked and will not go where  
I stand in the saddle and then the horse lay flat down  
in the river. Gun last went down to the river  
and can be pulled over. By night we  
had dinner and late did the going into the  
river.

About noon Mr. Jones shot a badger and  
we had to dig him out of his hole.

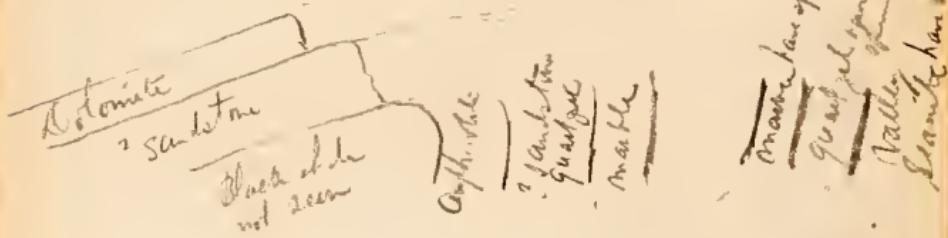
Our camp was pitched on the south side  
of a hill common near the ranch of Mr. Buddekin.  
On the hill S.E., was a farm containing in a  
granite hill where he collected graphite, iron and  
granite. The graphite with iron is interbedded  
with the granite. This granite is about by pegmatite.

I collected mostly in Buddekin house about  
half mile. Here we secured a granular white marble.  
It stands on the against a great rock <sup>to the east</sup> with other  
big green marble following westward granite.  
The marble has streaks of iron. To the west  
the marble occurs an arthritic schist. Gabbro  
also occurs here. The age of the marble is  
not known but the occurrence of the rock  
at a depth of 1000 ft. was bed? It's  
relation to the slate is. The granite  
is a fine-grained. There may also  
occur the occurrence of graphite in granite.  
and a number of flowers here.

Aug 27-99 Sunday. Camp XVIII.

We make my last camp and get away by 8 A.M. road lunch on the Laramie Plains and arrived at Laramie by 3 P.M.

In coming down the Laramie Valley it seems plain to me that Knights Tone that the marble collects fossils in the metamorphosed Carboniferous Dolomite. The structure seems to be about as follows:



I have specimens of the marble with serpentines and also of the dolomitic shales I suppose furnished the marble.

Spent part of the afternoon at Knob Hill house and then white for a clean cloth and a wash. Spent the night at Knights house.

17 11

- 1 Lordley (North West shore th T. I. of th Sights  
due to horizon sand. The hill is not the  
main ridge in the foreground  
Partially 2 hills on either side.
- 2 On the Fregate with views, mostly N E.  
at the distance of one mile J. 58.  $\frac{1}{2}$
- 3 On the F.O. crabs are found at the  
front part of the Triassic  $\frac{1}{2}$  mile  $\frac{1}{2}$   $\frac{1}{2}$   
4 In the crater broken blocks of  
volcanic stuff are common to Trappe  $\frac{1}{2}$   $\frac{1}{2}$   
Outcrop.
- 5 Eastern Shuff F.O. in shaggy state near  
S.E. end of Trappe Outcrop showing the caldera.

Parker Hetherton

Ed Harper.

April 11 - 1901 - on top of the hill

